

**UNITED STATES DEPARTMENT OF COMMERCE****Pat nt and Trademark Offic**

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the

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
|-----------------|-------------|----------------------|---------------------|
| 09/530,588 | 05/05/00 | MATSUSE | K 2312-0866-2P |

MMC1/1004

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EXAMINER

QUACH, T

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 10/04/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trad marks

Office Action Summary

Application No.
09/530,588

Applicant(s)
Matsuse et al.

Examiner
Quach, T.

Group Art Unit
2814



☐ Responsive to communication(s) filed on _____.

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire three month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 9-16 and 24-27 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 9-16 and 24-27 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☒ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 5

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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DETAILED ACTION

In the original specification filed May 5, 2000, applicant indicated that Claims 1-6 and 17-23 are "deleted" and skipped claims 7 and 8. Under Article 34, thus only claims 9-16 and 24-27 are present and examined in this case.

Claims 9-12, 13-16, 24, and 25-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 9, 13, 24, and 25, it is unclear or indefinite as to what is encompassed by x or y which were not defined. The reference of tungsten silicide in parentheses is vague and indefinite as to what is being claimed. Applicant is suggested to recite the claims as "barrier metal if formed of tungsten silicide nitride having chemical formula ... " and further provide the range of values for x and y, or if not, delete such indices which presently are undefined and characterized. In claim 12, 16, and 4, it is unclear and indefinite as to what x encompasses.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 9-12, 13, 15, 16, and 25-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Agnello et al.

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Agnello et al. (5,796,166) teach forming multilayer structure comprising polysilicon layer barrier refractory metal-silicon-nitrogen intervening layer, and upper conductor thereon, e.g., including refractory metal such as W. The use of TaSiN and the replacement of W for Ta is also taught. The gate structure on gate insulating layer on gate oxide and adjacent source/drain regions and the use of are also taught. See column 5 lines 10-17, lines 56 to column 6 line 28.

Claims 11, 14, 15, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agnello et al. taken with Wolf et al.

Agnello et al. as applied above do not show the alternative conductor material of Cu and do not show the polysilicon layer in a capacitor.

Wolf et al. teach on pages 192-192 alternative conductor materials for VLSI conductor materials including tungsten, aluminum which has lower resistivity, and copper which has low resistivity and good electromigration resistance. Wolf et al. show on pages 589 and 590 the capacitor electrode including polysilicon layer which corresponds to a one transistor cell. See Fig. 8-10 and 8-11.

It would have been obvious to one skilled in the art in practicing the above reference to have employed Cu in place of tungsten for the conductor material since such is conventional and advantageous to obtain reduced resistivity and good electromigration resistance as taught by Wolf et al. It would have been obvious to have included the capacitor structure as shown in Wolf et al. wherein the same layer material to make the gate could be employed for the capacitor plate as well.

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Claims 12, 16, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agnello et al. in view of Katoh.

It would have been obvious and would have been within the purview of one skilled in the art to have employed in Agnello et al. the alternative gate insulating materials in claim 4, e.g., tantalum oxide since such corresponds to conventional and advantageous gate insulating material as evidenced by Katoh, column 1 lines 60 to column 2 line 13, lines 53-64.

Regarding any other insulating materials claimed, such use would have been obvious given the acknowledgement of such alternative materials in the specification page 12 lines 10-12, page 13 lines 14-15. In addition, official notice is given regarding such use of such materials for gate insulating layer.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Byun et al., Hu, Kizilayalli et al., Lee, and Nguyen et al. teach composite gate including metal silicon nitride.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Quach whose telephone number is (703) 308-1096. The examiner can normally be reached on Monday through Friday from 8:30 to 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (703) 306-2794. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722 or (703) 308-7724.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

A handwritten signature in black ink, appearing to read 'Tuan Quach', with a stylized flourish at the end.

Tuan Quach
Primary Examiner